

Wednesday, December 18, 2013
2:10 PM

- general form (quadratic eqⁿ): $y = x^2 - 5x + 4$
 ↑
 "+" open up
 ↖ y-intercept

- could use table of values to graph, but let's factor instead

- factor to find the x-intercepts
- $$y = a(x-r)(x-s)$$
- $$y = (x-4)(x-1)$$

X-intercepts are 4 and 1
(roots, solutions, zeros)

- from the x-int can get axis of symmetry " $x = _$ "
(could use any 2 x-coordinates with the same y-coordinate)

$$X = \frac{4+1}{2} = \frac{5}{2} = 2.5 \quad \therefore \text{axis of sym} \\ X = 2.5$$

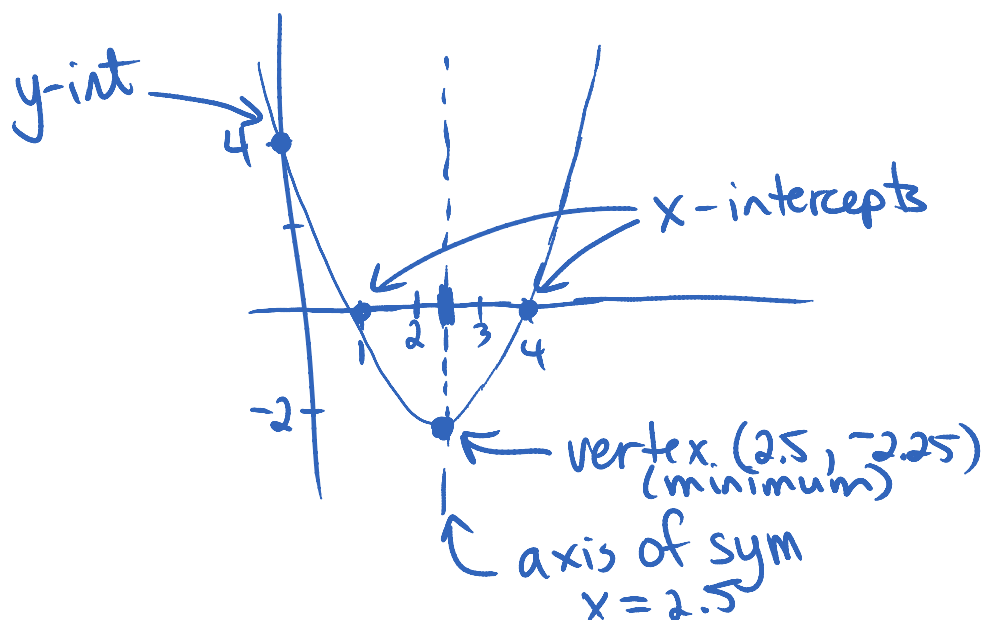
- using axis of sym. as the x value, we can find the vertex \rightarrow plug into equation.

$$y = x^2 - 5x + 4$$

$$y = (2.5)^2 - 5(2.5) + 4 = -2.25$$

\therefore vertex: $(2.5, -2.25)$

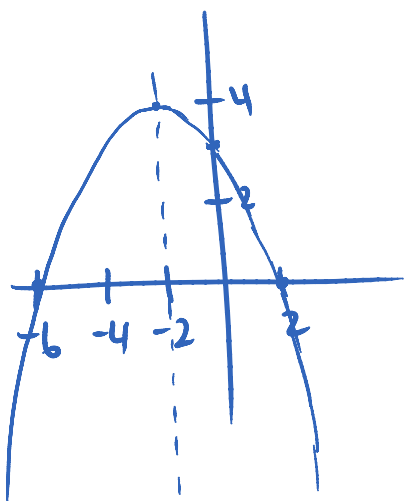
— Now have key points, can graph



Domain
 $x \in \mathbb{R}$

Range
 $y \geq -2.25$

② Given graph \rightarrow find equation



What we can read from graph:

y-int = 3 or $(0, 3)$

x-ints = -6 and 2

line of sym: $x = -2$

Vertex: $(-2, 4)$

Domain:
 $x \in \mathbb{R}$

Range:
 $y \leq 4$

— Start with "factored form"

$$y = a(x-r)(x-s)$$

plug in x-intercepts

$$y = a(x-6)(x-2)$$

$$y = a(x+6)(x-2)$$

- use a point on the line (y-int or vertex: y-int is easier (0,3)) to find "a"

$$3 = a(0+6)(0-2)$$

$$3 = a(6)(-2)$$

$$3 = a(-12)$$

$$\frac{3}{-12} = a$$

$$-\frac{1}{4} = a$$

∴ equation is $y = -\frac{1}{4}(x+6)(x-2)$

- lastly, put into general form $y = \sim x^2 + \sim x + \sim$

$$y = -\frac{1}{4}(x^2 + 4x - 12)$$

$$y = -\frac{1}{4}x^2 - x + 3$$

"-" opens down ✓

y-int ✓

When solving problems:

- max/min = highest/lowest = y-coord of vertex

- time = x

if looking for x, often it is the x-intercepts (y=0)

Practice pg 398 # 9, 10
pg 407 # 7, 11, 14